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ENVIRONMENTAL QUALITY

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17 November 1982

WORLDWIDE REPORT ENVIRONMENTAL QUALITY

No. 378

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ENVIRONMENT CENTER REPORT ON NORTHEAST FORESTS

Calcutta THE STATESMAN in English 6, 8 Oct 82

[Article by Kalpana Sharma and Shahnaz Anklesaria]

[6 Oct 82 p 8]

[Text] No Friends of North-Eastern Trees

THE north-east of India, linked to the rest of the country by a narrow corridor sandwiched between Nepal and Bangladesh, has one of our largest reserves of sub-tropical forests. Administratively divided into five States and two Union Territories, the region can be regarded as a single entity because of its common features.

The north-east accounts for one-seventh of the total area under forest in India. It also plays host to a variety of birds and wild animals, including the famous one-horned rhinoceros, and to precious varieties of plant species. But the region's forest wealth is beginning to disappear before the very eyes of the people who have lived in its midst for thousands of years.

Before the advent of roads, railways and so-called "economic development", the hills of the north-east and the fertile plains along the banks of the Brahmaputra were covered with lush sub-tropical forests bearing large quantities of evergreens and deciduous trees. The people in the hills—over 150 tribes—lived in harmony with the forests around them and practised a form of agriculture that allowed them to cultivate the steep slopes. Today, many tribes still follow this age-old method of cultivation called jhum (shifting cultivation)—an estimated 1.6 million are engaged in it—but there is disharmony. The forest areas are decreasing,

human habitations are increasing, and the fertility of the soil is diminishing at such a rate that the land is becoming barren.

SHRUBS REMAIN

Meghalaya ("abode of the clouds"), a State created out of three hill districts of Assam in January 1972, has seen the thick, tropical forests covering its terrain reduced to shrubs. It is difficult today to find a forest more than 50 years old. The reasons for the denudation of Meghalaya's forest resources are at least partly linked to its complicated administrative structure. Under the Sixth Schedule of the Constitution, Meghalaya is divided into three district councils—Khasi, Garo and Jaintia Hills—which are elected legislative bodies with wide powers of governance, often duplicating those of the State authority.

Official statistics claim that 36.60 per cent of Meghalaya—or 8,528 sq kms—is forest area. This is well below the 60 per cent forest cover laid down for hill areas by the National Forest Policy of 1952. The area under reserved forests, as claimed by the Meghalaya Forest Department, is 706 sq kms, that is, only four per cent of the total area of the State. In effect, this is the only protected forest cover in Meghalaya. The remaining 7,719 sq kms, or 90.51 per cent of the State's forests are unclassified State forests. They consist of forests directly managed by the district councils, com-

munity-owned forests, village forests and forests owned by clans or individuals.

There is no data available on the extent of deforestation in these unclassified forests but it is apparent that it is extensive. The reason is the nexus between the desire for ready cash among the tribals and the opportunities provided by non-tribal contractors operating from outside the State. As private ownership is permitted under the Sixth Schedule, no State authority can check what tribal owners of forests do with their trees. Further, they are granted tax exemptions and other benefits not available to non-tribals.

The Garo hills, which only a few years ago had barely 15 to 16 officially licensed timber contractors operating within their forests, today have almost 800 licensed contractors. The bleak hills, which were once covered with sal trees, are an eloquent testimony to the pillaging of the forests. Most of the timber from Meghalaya finds its way to Assam. It is impossible to check timber being smuggled out of the State as the long border between Assam and Meghalaya is unmanned in many stretches.

The pattern of land ownership in Meghalaya and the consequent diffusion of authority makes supervision of forests, even by the district councils, difficult. Land laws are not codified. The tribals have an oral tradition. People depend on customary laws handed down from generation to generation. So there is no record of land rights to indicate how much land is clan land, and how much is community land or privately owned. Forests on such lands cannot be classified and are, therefore, open to unchecked exploitation.

There is only one plywood factory in Meghalaya, near the Assam border at Burnihat. But there are innumerable saw mills, some operating within the forest areas. The investment in these saw mills is minimal, while the profit margin is maximized. The Khasi Hills district council alone earns over Rs 40 lakhs per year from the export of timber. Unless they find alternative sources of revenue, district councils in the State are unlikely to take measures towards conservation.

WOOD DEMAND

The reserved forests in the State, minute in comparison with those under private ownership or district councils, are suppos-

edly managed according to a "working plan" and scientific tree felling. This system has proven flaws, but its advantage is that it gives a vigilant and conscientious forester the powers to check the extent of damage visited on a forest. In the forests under the district councils, there is no such plan of management, nor is there adequate supervision once timber contractors move in. The destruction, therefore, is all the more rapid and permanent.

The hilly terrain of Meghalaya, coupled with the numerous swift-flowing rivers and a stable geology, makes it ideal for the development of hydro-electric power. At present Meghalaya has an installed hydel capacity of 125.9 MW, providing by far the largest amount of hydel power in the whole north-eastern region. (Tripura comes a poor second with only 10.0 MW of installed capacity.)

Power in the State is generated from four projects: Umiam, stages one, two and three and the Umtru project. Another project is under construction. According to the Meghalaya State Electricity Board, no studies were done of the environmental impact of these schemes. Hydel works require the construction of reservoirs for storing water. The area of the Umiam project, for instance, had excellent pine forests which had to be submerged.

Apart from the exploitation of forests by timber contractors, and development activities such as dams, road building etc, the system of shifting cultivation has been a contributory factor in the denudation of the countryside. Jhumming is sanctified by socio-religious ritual; the Mizos' Lue Kaphe festival marks the search for a new field, while Kang-Ral-Ni mourns for creatures killed in a jhum fire.

The forests are victims of a vicious cycle. Because there are more people and less land for cultivation—forest land that was once freely available has now been cleared for townships and other habitation—the jhummiya has reduced the cycle from 20 to 30 years to five to six years. Consequently, forests cannot be regenerated in fields left fallow for such a short time. Agriculturists have found that, while the 20 to 30 year cycle was being followed, jhum was in fact the most suitable form of cultivation for these hill regions.

At present, according to the jhummin pattern most commonly followed, farmers clear

the forest, sometimes only the branches of the trees, in the first year. They let these dry in the sun, then burn the debris and, later, plant a variety of crops. In the second year they plant paddy. They use the same plot at the most for three years, usually after two they move on. Before leaving, they plant trees on this plot so that a fresh growth of forest can cover the land.

SOIL EROSION

The reduced jhumming cycle does not allow the forest to grow; it also encourages the spread of harmful weeds that would have died if the area had not been cultivated again. The slashing of the forest, and the subsequent burning, encourages the growth of certain weeds like eupatorium which has now become a real menace in the north-east. It is largely responsible for reducing the nutrient value of the soil. The steepness of the slopes and the high rainfall also lead to severe soil erosion. Over time, hillsides are laid bare. The system of "bun" cultivation, where the tops of hills are used to grow potatoes on raised beds along the slope, has resulted in an annual soil loss of 40 to 50 tons per hectare.

The most stark example of the compounded effect of excessive jhumming is seen in Cherrapunjee, once the wettest spot on earth. With an average rainfall of 1,150 cm, which comes down

in torrents between the months of May and September, one would expect this region to be covered with lush sub-tropical vegetation. Instead, Cherrapunjee is a virtual desert: there is practically no topsoil on its barren hillsides. The people who lived off jhumming have been forced into other occupations. About 80 per cent of them have found employment in the local cement factory. That Cherrapunjee was once part of a sub-tropical forest is proved by the existence of a few sacred groves, which have been protected from the lumberjack's axe. The rich variety of vegetation in the Mawsymai sacred grove, near Cherrapunjee (or Sohra, as it is locally known), stands out as a vivid reminder of what the area was once like.

It is clear that an alternative to jhum will have to be found, or other sources of employment for those dependent on the land if the remaining forests are to survive. Extensive studies have shown that the popular theory that intensive terraced cultivation is best suited to these hill regions is not necessarily true. The capital-intensive inputs required in terms of fertilizers put the green revolution type of agriculture out of reach for the small tribal farmer. Jhumming, on the other hand, satisfies their immediate food needs. What they need to know now is how to cultivate the hillsides without eroding the soil to the point where nothing can grow.

[8 Oct 82 p 8]

[Text] Trees Have No Votes in Assam

SOME tribes have come up with their own solutions to the problem of soil erosion. For instance, in Nagaland, the Angamis practise bench terracing even on steep slopes. They grow paddy in these fields and have a system of irrigation where water from higher terraces flows down into lower ones. The Apatani tribals in the Subansiri district of Arunachal Pradesh have evolved a method of valley land cultivation. They have utilized an area of 2,000 hectares of plateau, at a height of 1,600 metres, for paddy cultivation without any modern irrigation system.

And in Muktapur, in the Jaintia hills of Meghalaya, the tribals have an ingenious bamboo drip irrigation system whereby they harness natural streams at

the top of a slope to irrigate betel leaf and areca-nut trees which they grow along the slopes. These local examples would be easier to popularize, and display a wisdom which modern methods often do not.

DEMAND

The north-east, particularly Assam, supplies 60 per cent of India's plywood requirements. But the raw material needs of the factories, in thousands of cubic metres every day, cannot be regenerated at the speed at which they are consumed. This unending demand for timber for industrial purposes is only one part of the hydra-headed monster which is consuming the forests of Assam. According to official statistics, 36.4 per cent of the State's total area is under forest;

in reality, as even forest officials readily admit, the percentage is closer to 19. Politically motivated schemes for settling people have also contributed to deforestation.

Between 1937 and 1946, Assam's minority Muslim League Government led by Saadullah used a "Grow more food" campaign to bring in thousands of Muslims from East Bengal. Forests were cleared for paddy cultivation, the object being to create a Muslim majority so that Assam could go to East Pakistan. The scheme did not work, but the process of immigration could not be checked. The current agitation against foreign nationals has its origins in this strategy.

The problem did not end with partition. Any budding politician knew that if he gave people the legal right to settle down, he would have a readymade vote bank. They, therefore, encouraged people to encroach on reserved forests, the courts usually thwarting eviction attempts. But whatever the outcome, trees were felled. As one forest official commented bitterly, "Trees have no votes." In time the area was dereserved and encroachers made legal settlers. According to the forest department, between 1961 and 1981, 11,241 hectares of reserved forest were dereserved for human settlements. In addition, an estimated 1.36 lakh hectares of forest land are now under encroachment.

Forest are also used to rehabilitate flood victims. But one such a settlement is created, it grows and eats into the forest as is evident in the Panhari reserved forest, adjacent to Kazhiranga, where, a quarter of the total area of 1,039 hectares was dereserved to settle 300 flood-affected families from Mozuli island in the Brahmaputra. Panhari's soil being unfit for paddy cultivation, which these people were used to, all they can grow is mustard and vegetables. But stealing firewood from the forest gives them an additional income. They are gradually encroaching further into the forest and cutting down more and more trees.

State politicians also exploited a provision of the Indian Forest Act (1927) which allowed a limited number of villages to be located inside reserved forests to house maintenance labourers, to settle immigrants. Each family was entitled to eight hectares of land to clear and cultivate, and

also to keep five head of cattle.

Such villages multiplied after Independence. Their inhabitants worked outside the forest but claimed privileges such as tax exemption. The original clearing, being unchecked, gradually expanded, and Silchar now has 116 forest villages. The creation of more was stopped by the 1980 Forest Conservation Ordinance which prohibits the use of any forest land for a "non-forest" purpose without the Centre's prior approval.

DIVISION

The division of Assam into several States also affected forests as many as them are the subject of boundary disputes. In the Behali reserved forest in Darrang district along the Arunachal Pradesh border, for instance, there is a 22-km strip which has not been surveyed. Arunachal's tribes are accused of taking over 74 sq km of the reserve forest in Assam. The same story is repeated along the Assam-Nagaland border where clashes resulted in numerous deaths. Extensive forest lands are destroyed in such quarrels.

Upper Assam, and specially the district of Dibrugarh, has native trees like the Hollong, which are the best in the world for plywood. Hollong grows tall and straight for several score feet, all its branches are concentrated at the top and it is free of knots. It is ideal, therefore, for peeling and pressing into plywood sheets. The improvement in communications and roads, and extension of the railway line, made a plywood industry feasible. The State offered such attractive incentives that plywood millers closed shop in West Bengal and moved to upper Assam. Today there are 52 plywood factories in the State and the industry contributes a significant portion of its revenue. Exports of decorative and commercial plywood and tea chest panels were worth Rs 10 crores in 1981, the industry contributing another Rs 20 crores in taxes.

The wood supplied to millers is heavily subsidized. They buy timber, priced at Rs 1,485 per cubic metre in the market, for Rs 500 per cu.m. for tea chests, and Rs 740 per cu.m. for decorative plywood. Assam's forests can meet only 22 per cent of these requirements: the rest comes from Meghalaya, Arunachal Pradesh and Nagaland,

much of it through illegal felling.

Since the recent orders by Arunachal Pradesh and Nagaland banning the movement of sawn timber outside their States, Assam's plywood industry has faced difficulties. The pressure on Assam and Meghalaya forests is bound to increase. Illegal felling poses few hurdles for the timber contractor, as low-paid forest guards are easily bribed and the industry's political influence ensures official support even at the cost of forests.

DENUDATION

Jhum cultivation in the two hill districts of Assam—North Cachar hills and Karbi Anglong—which have 40 per cent of the State's total forested area, also contributes to deforestation. Oil and coal discoveries in reserved forests means further denudation, and haphazard collection of firewood exposes the periphery of forests to illegal felling.

River silting is the most important consequence of deforestation. The turbulent Brahmaputra originates in Tibet, makes its way along the Himalayas through Arunachal Pradesh, to mark a winding and often changing course through 640 km of Assam. This impressive river, which in parts is 16 km wide, is fed by tributaries which have turned into gushing torrents because of deforestation in the catchment areas. The Brahmaputra is loaded with increasing quantities of silt each year. The Brahmaputra Flood Control Commission's case study of the Puthimari river, one of the

major northern tributaries which originates in the sub-Himalayan ranges of Bhutan at a height of 4,350 metres, showed an average rise in the river bed between 1968 and 1975 of 0.5 metres to 1.35 metres per year.

Another indication of the same phenomenon is obtained from Dibrugarh's Embankment and Drainage Department. The danger level of the Brahmaputra at Dibrugarh is 119 metres. The high water mark for the last 40 years has shown a gradual rise and, since 1960, has always been above the danger mark.

Despite the increasing damage caused by floods each year, there is little co-ordination or joint planning by the departments of flood control, soil conservation and forests. Each looks at its own problems. Furthermore, as the catchment areas lie outside the State, the State Government alone can do nothing without a joint north-eastern plan and Bhutan's cooperation.

The root cause of many of Assam's problem seems to be an unnaturally high increase in population over the last 30 years. According to the 1971 Census, more than 18 per cent of the people work on the land. The growth of population between 1961 and 1971 was 34.95 per cent, as compared to the all-India average of only 24.80 per cent.

Unless people are given other sources of livelihood, they are bound to want at least a small plot of land. In these circumstances, the pressure to occupy reserved forest lands is only understandable.

CSO: 5000/7004

INDIA

BRIEFS

GANGES POLLUTION--KANPUR, October 11 (PTI)--The water of the Ganga is perhaps the most polluted in Kanpur with total bacterias counted to ten million per 100 millilitres of water at Sarsaiya Ghat creating health hazards not only for the citizens of Kanpur but more for the rural population on the banks of the river downstream also. This was revealed in a survey conducted by Dr. H. C. Arora, Mr. S. N. Chattopadhyaya and Mr. Tapen Jouth of the National Environmental Engineering Research Institute, Kanpur zone. The samples were collected from nine sampling stations covering 19 km. from Kanpur, they said. [Bombay THE TIMES OF INDIA in English 12 Oct 82 p 23]

CSO: 5000/7005

NORTHERN REGION HAS THE WORST POLLUTION PROBLEMS

Kuala Lumpur NEW STRAITS TIMES in English 23 Sep 82 p 4

[Text]

IPOH, Wed. — The Ministry of Science, Technology and Environment has placed the northern region of Peninsular Malaysia top on the list of areas requiring pollution control.

This region, comprising Kedah, Perlis, Penang and Perak, has some 1,200 sources of pollution by factories. It also has the majority of the air and water pollution complaints lodged since 1978, the Minister, Datuk Amar Stephen Yong, said here today.

In view of this, not only has

the environment division of the Ministry emphasised its pollution control activities in the region but there are groups of members of the public and non-government bodies with the same objective, the Minister said.

The Minister's speech was read out by the Ministry's deputy secretary-general, Syed Abdullah bin Syed Yahya, at the opening of a two-day seminar on environmental pollution control and management here.

Seventy-four executive staff, including factory engineers, chemists and managers from 53 organisations, are attending the seminar jointly organised by the environment division of the Ministry and the Malaysian Association of Productivity.

Datuk Amar Stephen said there are 21 industrial areas in the northern region, with 67 rubber and 30 palm oil factories.

There are other factories such as textile,

laploca, electronic, metal plating from which effluents containing organic or inorganic waste pollute rivers.

He said pollution was acute in five rivers: Sungai Juru, Sungai Merbok, Sungai Prai, Sungai Krian and Sungai Jejawi.

The waters were further polluted by liquid wastes from homes and silting incidents caused by land development activities and natural sources.

The existence of some 800,000 vehicles in the region also contributed to air pollution, the Minister said.

Being fully aware of this, the government has introduced various measures to control environmental pollution.

"We cannot adopt an indifferent attitude towards the problem. If no action is taken, pollution will endanger the source of our water supply and threaten our health and well being," he added.

INFORMATION SOUGHT ON SOURCE OF HAZE BLANKET

Samples Taken

Kuala Lumpur NEW STRAITS TIMES in English 29 Sep 82 p 3

[Text]

PETALING JAYA, Tues. — The Malaysian Meteorological Service (MSS) is continuing to study the haze phenomenon and has requested information on forest fires and volcanic eruptions from its counterparts in Indonesia and "earth resources satellite" pictures from the United States.

The Environmental Officer of the Meteorological Service, Mr Chow Kok Kee, briefing the Deputy Minister of Transport Datuk Abu Hassan Omar this morning, said the MSS agreed with the finding of the Ministry of Science, Technology and Environment that the haze was accentuated by the burning of vegetation.

"The recent prolonged

drought in Indonesia has increased the incidence of bush and forest fires. This, accentuated by the burning of vegetation by man, has resulted in injection of an unusually large amount of suspended particulate matter into the lower troposphere."

Radiation

He said southerly winds carried these suspended particles over Peninsular Malaysia, Sarawak and Sabah. Atmospheric stability prevented these particles from dispersing into the upper atmosphere.

Mr Chow compared the present haze to a similar occurrence in 1972, caused by similar atmospheric conditions

and wind patterns.

The haze reduced visibility in certain areas to two to three km, interrupting aviation operations, he said.

Day temperatures were lower, there were fewer sunshine hours and lower solar radiation amounts during the peak of the haze on Sept. 11.

Mr Chow added: "It is unlikely that the present haze is caused by volcanic eruptions in Indonesia," as volcanic ash and smoke normally do not extend beyond 70 km from the source.

Dust samples taken during this period, which were analysed by the Chemistry Department, did not show significant increases in heavy metals, pH level or sulphates.

Government Inaction Criticized

Kuala Lumpur NEW STRAITS TIMES in English 26 Sep 82 p 10

[Editorial: "Declaring War on Pollution"]

[Text]

THE city of Kuala Lumpur, like the rest of the peninsula, has been swathed in a thick and unyielding haze for the past several weeks. An unwelcome visitor but there's nothing we can do to nudge it away.

We have been rather blandly told that the dust content in Petaling Jaya has been found to be six times more than the safety limit set by the World Health Organisation, and rather illogically that this high level of dust does not pose a threat to health. What does it do to people?

We have also been informed that for the past three years, the dust level in the Klang Valley has been twice as high as the WHO norm. Yet we have been advised "to live with it..." But for how long more?

It is one thing to be told the grimy facts and another to be told by the official keeper of the environment to tolerate and co-exist with a potential health hazard. One would expect a more sympathetic and sensitive response to such an issue of public concern.

It would be more reassuring to be told this: "We are as much concerned and perplexed as you are about the haze. We are sorry to admit that we can't do anything about it. It has actually come from outside and in circumstances beyond our control. We believe and we hope that it will soon go away — either it will dissipate by itself or get blown off by another wayward wind."

"We also want you to know that we are very worried by the continuing deterioration of the city air. We are now reviewing the

situation. If it is necessary, we won't hesitate to take remedial measures to clean up this air.

"Moreover, we earnestly urge you to co-operate with the authorities to keep our environment clean and wholesome..." Is all this too much to ask?

There are at least a couple of lessons to be drawn from our present encounter with this haze phenomenon. The first object lesson is the need for international co-operation to tackle transboundary environmental problems. For a start, can Asean countries get together to observe the "don't pollute your neighbour" principle adopted in Stockholm?

The second lesson is the need for good housekeeping. Have we kept our streets clean? Have we stopped all burning of rubbish in the open? Have we relocated the sawmills and other heavy industrial polluters away from residential areas?

Have we made a start to control the toxic emissions from the exhausts of thousands of cars, buses and lorries on the road? Have we made any attempt to reduce the lead content in our petrol?

We should not wait until the day when we must put on goggles and gas masks to walk in the streets. In looking East, we should also learn an environmental lesson from the Japanese. They have recently passed stringent laws and spent billions of yen to clean up the air. They have also made it a policy to make polluters pay. Why don't we?

CSO: 5000/8003

FISH SHORTAGE ATTRIBUTED TO POLLUTION

Manila PHILIPPINES DAILY EXPRESS in English 2 Nov 82 p 4

[Text]

THE COUNTRY'S problem in fish supply deserves the utmost attention of the authorities.

Fish provides 78 percent of the protein intake of the people, and the average Filipino needs some 34.6 kilograms of fish annually.

To illustrate the deficiency in fish supply, let us take the case of Northern Mindanao which has a population of 2.7 million people. The people there need some 93,000 metric tons of fish a year, but the fishermen in the region produce only 76,000 metric tons a year.

There are several reasons why fish supply is insufficient. The depletion of fish and marine life in traditional fishing grounds has been brought about by dynamite and trawl fishing and other illegal methods. In Lingayen Gulf, where fish used to be plentiful, the fishermen are no longer catching fish in the same quantity as they used to.

There used to be a variety of mudfish, *dalag*, *hito*, *gurami* and *martiniko*, in the ricefields. After every rice harvest season, the ricefields used to abound with fish and snails. Those happy days are gone. Fertilizer and pesticides have destroyed the fish in the ricefields.

Even rivers which used to be full of fish and shrimps are going dry or shallow because river banks have been filled with soil, and houses have sprouted. The rivers have become clogged by soil erosion and siltation.

Then there is the conversion of mangroves and marshlands into fishponds. Some people thought that by converting marshlands and mangroves into fishponds, they would increase fish supply and profit. They were mistaken. The disappearance of mangroves and marshlands means the annihilation of marine life.

We can also blame the wanton disposal of waste into rivers and streams by unconcerned industrialists. This has led to water pollution and, consequently, the death of all marine life. Despite constant warnings by the government agencies concerned, the pollution of rivers and streams by industrial wastes goes on and on.

It has been reported that the Philippines is being deprived of some 600,000 metric tons of fish annually due to illegal fishing by aliens in our territorial waters. Commodore Brillante Ochoco, commandant of the Philippine Coast Guard, says that alien fishing boats intruding into our vast fishing grounds have reduced the country's fish supply by as much as 50,000 metric tons a month.

We should not be deficient in fish. We have so many seas, rivers, lakes and streams. Our coastline alone is 17,500 kilometers long, second longest in the ASEAN region. Fish supply should not be a problem, but it is.

The government agencies concerned should look into all these problems before the fish supply situation worsens further. Press releases will not solve the problem.

CSO: 5000/4303

ATMOSPHERIC CONTAMINATION IN CENTER HAVANA NOTED

Daily Smoke Levels Measured

Havana REVISTA CUBANA DE HIGIENE Y EPIDEMIOLOGIA in Spanish Jan-Mar 82 Vol 20
No 1 pp 1-19

[Article by Carlos Barcelo, physics graduate of the National Institute of Hygiene, Epidemiology and Microbiology [INHEM], Department of Community Health, Infanta 1158, Havana City; Armando Cabrera, chemistry graduate of INHEM; Gloria Inclan, [INHEM graduate]; and Engineer Julio Munoz, electronics engineer from the IDS [Institute for Health Development], Parraga, Havana City]

[Excerpts] Concentration of smoke in the atmosphere were measured continuously at a specific point in Center Havana on a daily basis. Superficial air was suctioned through fine-mesh filters, and the reflectance was then measured relative to a standard curve. There was a 30 percent error when the calculations indicated $39 \mu\text{g}/\text{m}^3$, increasing for lesser concentrations. The shortage of data was compensated by the use of regressive models whose independent variable was the concentration of smoke from a particular neighborhood, and the parameter was the direction of the wind. Various analyses of chronological series were made by the power-spectrum method in different time lapses on a daily and monthly basis, taking into consideration the lack of any seasonal characteristics of the averages. A decreasing trend was clearly apparent in the overall 1970-1978 period, but the curve was not lineal. A distinct Markovian red stood out in many of the spectrums, some presenting significant superimposed cycles. After 1975, the spectral density on the monthly basis changed to a distinct white and developed a significant cycle of average frequency. The 2-year periods appear endowed with high daily frequency. Many regularities are repeated in them in the chronologically successive spectrum.

Adequate congruence was observed among the various scales of the chronological spectrums. The average daily temperature and humidity do not show any synchronous relationship with the contaminant in accordance with nonparametric methods. However, before 1975, there was a correlation with the average monthly smoke. Rain had a definite relationship with the smoke on the daily basis but not on the monthly basis. The direction of the wind was inconsequential, but the concentration of the smoke decreased with increases in the wind velocity in the monthly figures obtained before 1975. The general results

suggest that changes in the predominant sources of the smoke or city meteorological variations could be affecting the concentrations of smoke in Center Havana.

Conclusions

1. Through spectral analysis, it has been inferred that, in general, the chronological smoke series coincide primarily with lineal Markovian processes, and this makes it possible to undertake a prognosis using self-regressive models on both a daily and monthly scale.
2. Lineal Markovian processes are usually accompanied, in this type of case, by periodical complementary variations whose origin needs clarification. These variations must be assumed for the prognosis model.
3. Moreover, in the 1970-1978 period, we observe a general tendency for the smoke concentration to decrease in the superficial air at the particular area studied in Center Havana. The decrease was more noticeable in the subperiod 1974-1975 during which the contamination declined to some extent. However, in the 1976-1977 subperiod, contamination shows an increase. This is confirmed by the fact that the level, duration and frequency of the smoke-concentration peaks, which exceed the maximum permissible level--health norm--in the 2-year period 1971-1972, developed worse conditions than those of the 2-year period 1976-1977.
4. In the study of the relationship of the chronological smoke series with meteorological variations, the most noteworthy results are the following:
 - 4.1. The smoke concentrations do not show any relationships with the daily values of any of the meteorological variables except rain.
 - 4.2. In general, the smoke concentrations do not show any relationship with the monthly values of the meteorological variables except in the subperiod from May 1970 to March 1975 when we observe relationships with temperature, relative humidity and wind velocity.
5. The complexity of the statistical relationships obtained reveals that the application of mathematical dispersion models in a dense mixed area (residential and production) cannot be used with individual sources but must take into consideration the overall aerometric system.
6. To achieve a physical model of the system as a hygienic instrument, it is necessary to have an inventory (recording) of the expulsions of air-contaminating sources--fixed and movable--in terms of time, as well as knowledge of the fields of meteorological variables and their perturbations in the intricate physical structure of the city. This suggests the need for the treatment and automatic analysis of information pertaining to prevailing conditions characterized by the absence of a functional health zoning arrangement.

Sulfuric Acid Concentration Studied

Havana REVISTA CUBANA DE HIGIENE Y EPIDEMIOLOGIA in Spanish Apr-Jun 82 Vol 20
No 2 pp 19-35

[Article by Carlos Barcelo, Armando Cabrera, Gloria Inclan and Engineer Julio Munoz]

[Excerpts] A study has been made of the level of sulfuric acid in city atmosphere at a specific point of Center Havana through continuous daily sampling of superficial air made to bubble in a solution of hydrogen peroxide at a low rate of flow. After each sampling, the solution was brought to a pH of 4.5 by adding sodium tetraborate. There was a 30 percent error when the calculations fluctuated above $32 \mu\text{g}/\text{m}^3$ of SO_2 equivalent, increasing for lesser concentrations. The shortage of data was compensated by the use of a regressive model valid for a wind of the northern quadrant, whose independent variable was the daily acid in a particular neighborhood. In its absence, the monthly averages made up for the shortages. Various analyses of chronological series were made by the power-spectrum method on a monthly basis for the period 1970-1978 and on a daily basis in two extreme 2-year periods during that overall period. In the 8 years of observations, a statistically significant nonlinear trend was noted. In the 2-year periods, significant cycles and the trend appeared superimposed by the empirical spectrum on models of distinct Markovian red. The monthly spectrum was also characterized by the superposition of cycles on the Markovian red. The 2-year period 1971-1972 varied from that of 1976-1977 only to the extent of 6 to 7-day periodicities in the former. Adequate relationship was observed among the various scales of the chronological spectrums, emphasis being placed on a periodicity of 4 months. With the use of nonparametric methods, temperature was significantly proportional to acidity. An inverse relationship was observed with humidity and a direct relationship with rain on a daily basis in alternate 2-year periods, but there was no overall relationship--on the monthly basis--throughout the entire period. Wind direction was independent of acidity, but this was not so with the velocity, which was associated with the decrease in acidity on a monthly basis. The general results suggest an improvement in health conditions with the passage of time.

Conclusions

Given an adequate level of significance, the statistical analysis leads to the following conclusions:

1. Through the spectral analysis, it has been inferred that the chronological sulfuric-acid series coincide primarily with lineal Markovian processes, and this makes it possible to undertake a prognosis using self-regressive models on both a daily and monthly scale.
2. Lineal Markovian processes are usually accompanied, in this type of case, by periodical complementary variations whose origin needs clarification. These variations must be assumed for the prognosis model.

3. Moreover, in the 1970-1978 period, we observe a fluctuating tendency in the concentration of acid gases in the atmosphere at the particular area studied in Center Havana. This tendency is characterized by an initial rise until mid-1973 and then a decline. The net result is a decrease. This is confirmed by the fact that the level, duration and frequency of the acidity peaks, which exceed the maximum permissible level--health norm--in the 2-year period 1971-1972, developed health conditions which were worse than those of the 2-year period 1976-1977.

4. In the study of the relationship of the chronological acidity series with meteorological variations, the most noteworthy results are the following:

4.1. Sulfuric acid content and temperature are proportional in all chronological scales and periods researched.

4.2. In the most humid and coldest 2-year period, we observed an association which was inversely proportional to the humidity on the daily scale, but in the period as a whole this did not occur on the monthly scale. The rain was proportional to the acidity in the warmest and driest 2-year period on the daily scale, but in the overall period there was no significant association on the monthly scale. It is conjectured that there is a conjunctural balance between a drainage process associated with humidity and an accumulation process associated with the stability brought about by convective rains.

5. The complexity of the statistical relationships obtained reveals that the application of mathematical dispersion models in a dense mixed area (residential and production) cannot be used with individual sources but must take into consideration the overall aerometric system.

6. To achieve a physical model of the system as a hygienic instrument, it is necessary to have an inventory (recording) of the expulsions of air-contaminating sources--fixed and movable--in terms of time, as well as knowledge of the fields of meteorological variables and their perturbations in the intricate physical structure of the city. This suggests the need for the treatment and automatic analysis of information pertaining to prevailing conditions characterized by the absence of a functional health zoning arrangement.

8568

CSO: 5000/2006

AIR CONTAMINATION IN TOWN OF SIGUANNEY NOTED

Havana REVISTA CUBANA DE HIGIENE Y EPIDEMIOLOGIA Apr-Jun 82 Vol 20 No 2 pp 290-301

[Report by Maricel Garcia Melian¹, Doraida Rodriguez Sordia², Maria de la C. Molina³, and Ariel Balmaseda Valdivia⁴]

[Excerpts] Provincial Hygiene and Epidemiology Center, Sancti Spiritus.

In 1970, our country became a member of the Pan-American Sampling Network for Air Pollution and set up a program for the establishment of a national monitoring network. There are 15 fixed stations located in the province of Sancti Spiritus to measure sedimental dust. Of these, two stations in the municipality of Taguasco are especially important because they are located in the town of Siguaney, 1 kilometer distant from the cement factory bearing the same name. Our paper presents a statistical analysis of the results obtained from the monthly sampling of sedimental dust at the latter stations from 1975 to 1979, as well as a comparison between the two of them. Monthly and annual averages and yearly accumulative frequency distributions are reported. An estimate of the trend was also made on the basis of the annual averages.

Conclusions

1. Keeping in mind that the samples of sedimental dust were taken on a monthly basis and that 50 percent of them were above the average every year, we can deduce that the population of Siguaney was exposed to dust levels considered to be very bothersome during most of the time of the period studied.
2. The months in which the average concentrations were the highest coincide with the rainy season, inasmuch as the rains can cause a precipitation of the particles that are in suspension.
3. The trend estimated from the annual averages seems steady, which is an indication that the source of the emission maintained the same contaminating potential during the period studied.
4. Despite the fact that the direction of the prevailing winds were taken into consideration when situating the cement plant to avoid affecting the

population, we observed during the 1975-79 period that in 13.3 percent of the months, the winds maintained a predominantly southerly and southeasterly direction which drove the contaminating particles toward the urban area.

Recommendations

1. The Siguaney Cement Factory should consider the possibility of adopting measures intended to reduce the emission of contaminating particles into the environment.
2. Study the possible correlation that exists between the incidence of irritating diseases of the upper respiratory tract and the excessive concentration of dust in the Siguaney environment.

FOOTNOTES

1. BA in Pharmacy, in charge of the Chemistry Department, Sancti Spiritus Province.
2. Chemical Engineer, Department of Communal Hygiene, Sancti Spiritus Province.
3. Chemistry Technician, Depart of Communal Hygiene, Sancti Spiritus Province.
4. TSE [Technician in Sanitation and Epidemiology] Chief of the Department of Communal Hygiene, Sancti Spiritus Province.

8414

CSO: 5000/2007

REFORESTATION PROJECT DEVELOPMENT DISCUSSED

Havana GRANMA in Spanish 25 Sep 82 p 5

[Article by Raisa Pages]

[Text]



- (1) Principal Mountain Systems of Cuba
- (2) Legend
- (3) Northern and Southern Pizarra Heights in Pinar del Rio [Altura de Pizarra del Norte y el Sur]
- (4) Rosario Mountain Range [Sierra del Rosario]
- (5) Limestone mounds [Mogotes Calcereos]
- (6) Escambray Mountain Range [Sierra del Escambray]

- (7) Banao Hills [Lomas de Banao]
- (8) Cubitas Mountain Range [Sierra de Cubitas]
- (9) Maestra Mountain Range [Sierra Maestra]
- (10) Mayari-Sagua-Baracoa Mountain System [Sistema Montanoso Mayari-Sagua-Baracoa]

Just as man needs air to live, mountains need luxurious vegetation to cover their slopes and to protect them from erosion which penetrates the layer of vegetation and uncovers its rocky interior.

It is sometimes discouraging to observe the landscape without the greenery of the trees and to see how the sun parches the stone that is deprived of its layer of vegetation by the action of water and wind.

The main mountain systems of Cuba require urgent and selfless work by man in order to correct in time the impoverishment of the soil which due to various improper practices--among which were the indiscriminate clearing of trees before 1959 and migratory agriculture--have taken on the aspect of a disturbing state of erosion.

From the beginning, the revolution has focused its attention on this problem since extensive looting by Yankee companies and some irresponsible Cuban property owners in a few years did away with the age-old and patient work of nature.

Echoing the observations of a humble man who lived through that past, we repeat what a peasant of Pinares de Mayari said to us: "If for every tree that the American companies cut down they had to plant three, as required by an old law which was never obeyed in the pseudo-republic, the Yankees would have to plant trees in Cuba for 300 years."

Our revolution found a state of devastation and it is up to our working people to begin to repair the damage that has been done. Replacing trees is not a task of months but of many years because forests are not manufactured like machines and man must patiently plant the trees and take care of them for many years in order to receive the fruit of his labor.

Toward the Mountains

Among the lands calling for reforestation, those which most urgently need this work are the mountain systems. The most important mountainous regions of Cuba cover more than a million hectares and of these not less than 500,000 require the planting of forests because they are totally barren or because they have poor vegetation which must be replaced or enriched with suitable species.

This means that 50 percent of our mountains need reforestation. This is a project of great magnitude due to the difficulty of reforestation at those altitudes.

If one looks at the accompanying map, one sees that our main mountain systems run from east to west across the provinces in which they are located. This

position means that their areas need to be covered with forests because of their value in protecting the soil, water, the fauna, the landscape and the environment as a whole.

The work carried out by our revolution on hydraulic reservoirs could be seriously affected if there is no reforestation of the mountains since it is there that streams of water originate which feed the many dams built with direct or indirect reference to the orographic features.

If we analyze the situation in Pinar del Rio Province, we will see that all the dams in the south are directly related to the mountains because they were built at their bases since the waters which feed the reservoirs usually spring up in the highlands. If those mountains remain bare or with poor tree cover, the dams will continue to receive the soil washed down by the water, and the process of sedimentation will go on and with it the loss of the useful life of the dams. This must be prevented at any cost. For example, a dam built to last 50 years could, due to the action of the sediments from erosion, lose its capacity in 40 or 30 years or even less.

The forests have, in addition, another vital function for the economy and thus for society. It brings about the greatest possible absorption of rainwater into the ground so that it can then gradually flow into rivers and brooks which come down the mountains and feed the dams. Besides, a large part of our vertebrate fauna is dependent on the existence of different types of forests.

We must rescue living things on the eroded mountainous places. Our youths are performing and will continue to perform an honorable role in this task. The Union of Young Communists is organizing youth contingents to go to those areas to do forestry work, a school task for our youth who are always ready to help where they are needed.

Note: We thank Jose R. Gomez Ricano, a forestry specialist and vice minister for forestry affairs, for his collaboration.

Principal mountain systems of Cuba
from west to east

Species of trees now growing in the area
and those which will be used for re-
forestation

1- Northern and Southern Pizarra
Heights in Pinar del Rio [Altura
de Pizarra del Norte y Sur]

-natural pines. The plan is to plant
pines. In certain areas planted with
pines they have been combined with cof-
fee, a procedure allowing greater use
of the soil.

2- Rosario Mountain Range [Sierra
del Rosario]

-reforestation with broad leaved species
such as majagua and mahogany

3- Limestone Mounds (Mogotes Calca-
reos)

-the natural vegetation will be left:
these are rocky soils

4- Escambray Mountain Range [Sierra del Escambray]

-has been reforested with male pines, eucalyptus, African mahogany and Central American mahogany, among others. Some land will be planted with coffee since they are suitable for this purpose.

5- Banao Hills [Lomas de Banao]

-reforestation with mahogany, cedar and other broad leafed plants

6- Cubitas Mountain Range [Sierra de Cubitas] (Camaguey)

-is being planted with mahogany, teak and cedar

7- Maestra Mountain Range [Sierra Maestra] (Granma, Santiago de Cuba, Guantanamo)

-since the beginning of the revolution it has been reforested with male pines and de la Maestra pines, native of that area. Planting of de la Maestra pine, Santa Maria tree, mahogany, baria, carob, majagua, cuya, and other trees continues.

8- Mayari-Sagua-Baracoa Mountain System [Sistema Montanoso Mayari-Sagua-Baracoa] (Guantanamo and Holguin)

-reforestation with pines such as Mayari and male pines. Mayari pines, native of northeast Oriente, are now being planted. Also being used are blue majagua, najesi, cabbage tree, teak, Santa Maria tree and Antilles mahogany, among others.

9204

CSO: 5000/2005

WORST DROUGHT IN THIRTY YEARS DESCRIBED

Johannesburg SUNDAY TIMES in English 10 Oct 82 p 30

[Article by Norman Chandler and Isobel Shepherd-Smith]

[Text] **A HUGE area of Southern Africa stretching from the Atlantic to the Indian oceans is in the grip of what experts say is the worst drought in 30 years — and although some rain has fallen, it is far from sufficient to break the drought.**

The dry conditions have resulted in stock losses, human misery and millions of hectares of parched farmlands through Namibia, South Africa, Botswana, Zimbabwe and Mozambique.

The dreaded locust swarms have already started to make their appearance in the Eastern Transvaal, dubbed the "breadbasket" of South Africa.

In Botswana and parts of Zimbabwe it is said that the drought is the worst in 80 years. In some areas of northern Botswana, rain has not fallen for more than two years.

● Although in many parts of South Africa there is cooler weather this weekend, weather experts in Pretoria believe that a new high pressure system will result in soaring temperatures — some matching the 33 deg which have been recorded in some areas.

In many areas water supplies have dried up, and farmers

are selling their cattle at below usual auction prices.

The general manager of the South African Meat Board, Dr P H Coetzee, said yesterday that because of the drought, consumers may benefit through lower beef prices.

He said many farmers had been forced to dispose of stock "because of the severe drought, thereby considerably increasing the supply".

Discussions are to be held with the Wholesale and Retail Dealers' Association to devise a way of helping bring down the price without producers be-

ing adversely affected.

"The price of red meat is at its lowest in 18 months," said a spokesman for the Meat Board.

Water levels of dams throughout the sub-continent are at their lowest in many years. South Africa has 22 866 dams with thousands more in neighbouring states.

As an example, the Hartbeespoort Dam, which serves a huge area of the Western Transvaal, is 57 percent full, compared to 94 percent at the same time last year.

The Klipvoor Dam in BophuthaTswana is only 38 per-

cent full as against 71 percent last year, and the Lindleys Poort Dam, which serves much of the Marico District, is a mere 19 percent full.

The Vaal Dam, from which most of the Rand's water is drawn, is at 52 percent, about the same as last year.

In the Western Cape, which has been experiencing parching temperatures over the past few weeks, the Steenbras Dam — which supplies Cape Town — is down to 45 percent, half its capacity.

In Natal, the Hluhluwe Dam is holding 49 percent of its total, while the Chelmsford Dam is at 26 percent.

Malnutrition

Cattle and other stock are dying in their hundreds throughout Botswana and Zimbabwe. In some areas there have also been severe health problems among the local population.

In central Botswana, several children have died as a result

of malnutrition, and health authorities are trying to contain the possibility of a spread of disease as a result of the lack of water.

Natal is being devastated by one of the worst droughts in years. Utrecht, in the north of the province, has applied to be declared a drought stricken area.

The vice-chairman of the Utrecht Farmers' Association, Mr T van Rooyen, said they had severe problems.

"The water supply is dwindling away without the possibility of getting anymore," he said.

"Farmers are drilling for water without much success. The existing dams are drying up rapidly and the grass and grazing is on its last legs.

"There is no re-growth because it is so dry. All the farmers are trying to get hold of hay

for their stock.

"In the Utrecht-Newcastle-Vryheid area there are at least 150 farmers who have to import hay from other areas of

South Africa."

Mr van Rooyen said that although farmers "will be able to hold out", the condition of stock is going causing concern.

"The farmers are also afraid because with the first rains comes a cold spell. Because their condition is so bad, the stock may not be able to take the cold conditions and as a result they may die.

Worst

"I have been farming in the area for over 30 years and this is the worst drought we've had.

"I have about 800 head of cattle and 3 000 head of sheep. Some farmers have 3 000 head of cattle."

Livestock is threatened and so are crops. There is warning of maize crop failures. In the Free State, wheat crops are threatened as well.

In the Eastern Transvaal, parched farmlands are mute testimony to the drought — the Crocodile River, lifeblood of the region, is almost dry in

some areas, and huge swarms of locusts have already started to appear in the Onderberg area near the Mozambique border.

Some farmers estimate they will need a good week's rain very soon to alleviate the situation.

The dry Umfolosi River is being dredged for water, while in many areas farmers are also drilling for more water on their own farms as boreholes dry up.

The Pongola River is "useless" according to one farmer's wife, and Mtubatuba has rationed water to two hours use a day.

In northern Zululand, as in most similar areas throughout the country, wild animals from the game reserves have fled to nearby farms in a desperate search for water.

Mr L M J de Jager, chairman of the Bayala and Northern Zululand Farmers' Association, says the situation is worsening as the days get hotter.

CSO: 5000/25

DROUGHT SCYTHES THROUGH BLACK STATES

Johannesburg THE CITIZEN in English 25 Oct 82 p 9

[Text] HARARE. — A drought regarded by meteorologists as one of the worst climatic disasters in the region's history is cutting a swathe of destruction through Zimbabwe, Botswana, Mozambique and other parts of Southern Africa.

Cattle are dying, dam levels are falling, crops are wilting and grazing land is bone-dry in many parts of the region. Some farmers have been hit by drought twice in the past three years and in many areas no rain has fallen for five months.

Haunted by the spectre of prolonged drought, thousands of Zimbabwean villagers and town-folk gathered recently in the stricken southern province of Matabeleland to pray for rain.

Black Zimbabweans believe such disasters are caused when they anger the spirits of their ancestors and the spirits must be appeased by ritual before rain will fall.

The ceremony was held in the Matopo area believed to be home of ancestral spirits of the Ndebele tribe.

Relief officials in Zimbabwe say two-million people, mainly children,

could starve to death and 500 000 cattle are threatened.

Worst affected are the two provinces of Matabeleland and Masvingo. Cattle are dying at the rate of 22 a day, mainly in Matabeleland, the country's main ranching area, according to official figures.

Officials forecast a sharp drop in maize production, down from 2,4 million tons in 1980-81 to 1,4 million in 1981-82.

"The big effect has been on the livestock industry because the drought has been particularly severe in the southern half of the country," says Mr Denis Norman, Zimbabwe's Minister of Agriculture.

In Mozambique, the drought has hit the Southern Maputo province. Officials say the situation is critical in the Magude and Moamba districts where virtually every dam has dried up, forcing the authorities to slaughter cattle before they die of thirst.

Production of maize, potatoes, citrus fruits and cassava has been seriously affected.

Although a two-year drought in the northern province of Nampula,

which threatened half-a-million people, broke this year, officials say many people are still affected because the staple crop cassava, which takes over a year to mature, has not yet ripened.

The UN Food and Agriculture Organisation is now working with the government's Natural Disasters Commission to establish an early warning system.

Botswana, which has a large desert area, has appealed for international aid to ease the effects of drought and save its lucrative cattle industry.

Zimbabwe's chief meteorologist, Mr Todd Ngara, says the current Southern African drought was caused mainly by high pressure in the upper atmosphere over Botswana.

"The migratory inter-tropical zone normally causes rainfall across Southern Africa. But during the last rainy season its geographical position was not only elusive, but it was also not associated with useful rainfall," he says.

Weather experts agree that during 1981-82, most of Zimbabwe received

less than 60 percent of normal rainfall, the worst-hit parts of Matabeleland recording only 40 percent. — Sapa.

CAMEROON

BRIEFS

VOLCANO ERUPTS--Yaounde, October 20--Mount Cameroon, a 4,000-metre high volcano in the west of the country, began erupting at the weekend, the national radio reported. Lava has been escaping from the volcano's central crater for the last three days, but none of the villages on its slopes was threatened, the radio said. Mount Cameroon's last two eruptions were in 1959 and 1922. (A.F.P.) [Text] [Paris AFRICA AFP in English No 2943, 22 Oct 82 p 10]

CSO: 5000/26

DROUGHT IN NORTHWEST TRANSVAAL DESCRIBED

Johannesburg RAND DAILY MAIL in English 8 Oct 82 p 11

[Article by Chris Marais: "Where Even Clouds Mock the Land"]

[Text] Even politicians take a back seat when the rains don't come to the north-western Transvaal. Nothing but Providence and a fat, bursting thunderstorm can put matters straight. It's nearly three years since the farmers living near the Botswana border have seen their fields drenched--and time is wearing them down.

OOM Wynand Snyders sits under his mulberry tree after supper each night, waiting for the mosquitoes.

He knows it won't rain until he hears that minuscule whine and feels the tiny bloodsuck bite on his arm.

Koos Pretorius says it must still grow hotter in the bushveld.

"The chickens must be hopping from shadow to shadow before it rains."

Coenraad Meintjies was waiting for the 50mm cloudburst last Tuesday, driving his tractor round and round a dirt pan so it could become a little dam for him and his animals.

The Warmbaths butcher tells of boreholes going dry, boreholes that used to yield thousands of litres of water on the hour...

This is the north-western Transvaal and these are people who have been there for more than 20 years, people who have learnt not to trust the weatherman's charts.

Oh no, each has his own theory, and each his own faith.

Meanwhile, the bushveld is writhing in its third year of the dryness. The farmers say this year's drought -- the worst in more than 20 years -- is the result of last year's bad rains.

And as the circle turns, and the experts predict a nine year drought for the country, the bushvelders are pulling in their horns and staring up at the sky.

We took a ride through some of the worst-hit areas, from Warmbaths up to the Tuli Block where one suddenly comes face to face with a badly depleted Limpopo River winding up to Zimbabwe.

Outside Warmbaths the traffic police sat in the shade of a thorn tree, their reflector lenses catching the sun. Ahead on the highway a mirage shimmers on the road in a blaze of pure heat.

First signs of the drought were the young calves in the bullpen outside town, their sides caved in and ribs showing.

Coenraad's farm on the Vaalwater road was our first farm stop.

He took time off from his hole digging to speak:

"I've been here for many years, yes, many. And this is the first time I have had to go so far for water," he said disgustedly. "When do I want it to rain? Right now, of course!"

Indeed, it was overcast. But the fat clouds turned out to be fake and they just drifted off nonchalantly across the Botswana border. I wonder how many farmers had been watching those selfsame clouds at that moment.

Like his neighbours, Coenraad Meintjies is ploughing up the wet patches in the wild hope that they might contain some catchment water.

Meanwhile, the stock gets thinner and the feed more expensive.

The land holds the greyness of a sick old man, and the dust devils run riot on unplanted breaks of ground.

Hans Viljoen, up at Villa Nora, with his armless Venus de Milo resting on the TV set, looks back at the early 60s and says those times have come again.

His farm lies on the Palala River, which for more than 100 years has been the life feeder of his community.

"The Palala is drying up too fast. We have to sink the holes deeper and deeper

into the riverbed to get less water this year."

Down the road, living off the same river, is 68-year-old Wynand Snyders. Oom Wyn-

and looks down at the cracks in his river, picks out the lumps of clay and points to a dry indentation on the riverbed.

"That's where the crocodiles used to lie on the bottom of the river and wait for the fishes, their mouths open and ready for them."

"There used to be crocs all around here lying on the banks, gliding through the waters. Now they've all left with the water."

Wynand Snyders is 68 and tired of struggling.

"I don't want to have to fight like this on a farm. Someone made me an offer for a place earlier this year but he was beaten by the interest rates and so now I'm still stuck. I want to go and live a quiet life in Ellisras -- it's too tough out here."

He says if the Government had built sluices onto the Water Affairs weir upriver, the Palala would not have silted up and there would still be water.

But then he's not the only farmer with a score to settle as a result of the drought.

Over at Ellisras, Koos Pretorius reckons the bushbuck have eaten all his lucerne stocks, so he finds difficulty in feeding his livestock, especially at the price of supplementary meal.

In Ellisras, the watery pride of the town has always been the Mogol River. Now the giant excavators are tugging out the silt to get at the water table underneath.

At night, large herds of kudu and duiker

move like wraiths through the dark in search of watering places, their eyes lit up like laser flashes in the headlights of dust road travellers.

By day the game is nowhere to be seen, despite the fact that this is supposed to be wildlife country. The land is grey, and they seek refuge from the heat that grows by the week.

CSO: 5000/25

DROUGHT TAKES TOLL OF WILDLIFE IN KRUGER PARK

Johannesburg THE STAR in English 14 Oct 82 p 8

[Text] Skukuza--Rising temperatures are aggravating the serious drought in the Lowveld.

A spokesman for the Kruger National Park said today the whole of the game reserve was very dry and the animals in poor condition.

"The leaf eaters in particular are having a tough time. But even animals like warthogs and impala are in poor shape," he said.

Unless it rains soon many animals will die.

Water restrictions are in force in all Lowveld towns. Municipal inspectors are patrolling at night and finding people watering their gardens or topping-up swimming pools.

Some towns report less than a two-week reserve supply of water.

Boreholes are drying up and rivers have dropped to a mere trickle. Many farmers face ruin unless it rains soon.

The STAR's Africa News Service reports from Swaziland, adjoining the Lowveld, that more than 23 000 cattle have died because of the drought in Swaziland. But this could have been avoided, Swaziland Meat Corporation manager Mr John Fourie has claimed.

He explained owners could have sold cattle to the Meat Corporation before they died of thirst and hunger.

The Ministry of Agriculture in Mbabane has predicted another 11 000 to 12 000 head of cattle will die due to drought before the end of the year.

In Zimbabwe trains are killing more than 30 cattle a month in drought-stricken areas of Matabeleland.

The cattle are run over by trains as they graze on the narrow strips of grass on either side of the railway line.

A peasant farmer has reported losing 15 head of cattle this way.

STRICTER CONTROLS FOR ASBESTOS PLANNED

Johannesburg THE STAR in English 8 Oct 82 pp 1, 3

[Article by Sheryl Raine]

[Text] Stricter controls to reduce health hazards associated with asbestos will be introduced into the asbestos mining industry over the next two years by the Department of Mineral and Energy Affairs.

In a hard-hitting statement today, the department presented a formidable list of controls to protect the health and welfare of asbestos mine employees. Some are already in force, others have still to be implemented.

New regulations in the pipeline will add to the already long list of safety regulations which govern highly profitable asbestos mining concerns--but which have been criticised as inadequate by local and international medical authorities and trade unions.

Lung Disease

The moves for further controls of asbestos--"silent killer"--come after two documentary films on asbestos in South Africa were shown abroad and caused a political storm.

Controversy in South Africa and abroad about the health hazards associated with three types of asbestos, but in particular blue asbestos (crocidolite), has raged for years.

Several diseases, some fatal, are associated with people who work with asbestos, or their families, who may pick up asbestos fibres from their clothing.

Asbestosis, a crippling lung disease, does not necessarily kill its victims, but they are handicapped for life.

Mesothelioma, a cancer of the lining of the lungs, is usually fatal. The disease can lie dormant in the human body for up to 30 years, but victims usually die within a year of mesothelioma being diagnosed.

Among the new controls scheduled to come into effect are:

- Reduction in the acceptable asbestos fibre concentrations found in surface operations from five fibres per millilitre to two. This will come into effect on January 1, 1984.

- Modernising asbestos mills handling the production of the substance. Only about 10 percent of these mills are still regarded as antiquated, but the aim is to modernise them all.

- Phasing out of sun drying and double handling of asbestos. Research into the elimination of these procedures is being carried out at Ririe asbestos mill in the Kuruman area.

- A pre-employment information system to tell workers of the dangers of working

with asbestos is being designed. No date has been set yet for implementation.

In July there were 624 whites, 250 coloured and nearly 10 000 blacks in service on the country's 30 asbestos mines.

It is estimated, however, that more than 40 000 workers mine, produce or handle asbestos in the broader industry.

South African authorities do not believe that asbestos is as dangerous to health as

is claimed in other parts of the world.

Representatives of the Department of Mineral and Energy Affairs, who unofficially attended a world symposium on asbestos in Montreal in May, were satisfied that the world trend was not to ban asbestos mining altogether, but to reduce

associated health hazards. Some countries have banned asbestos — one is Sweden.

The milling of blue asbestos in Britain without special permission is prohibited.

Asbestos mining, particularly in developing countries, is largely considered too profitable to ban.

In recent years, South Africa has captured a sizeable part of the Western asbestos market.

World asbestos prices are rising steadily. The price is expected to reach R396 a ton this year and R437 next year.

SOUTH AFRICA

BRIEFS

DROUGHT RELIEF--Durban.--Steady soaking rain appears finally to have broken the drought in parts of the sugar belt along the Natal South Coast. According to local farmers the steady rains since the weekend have raised the water table level in many districts and there is every hope that the recently planted crops, thought to be doomed because of the drought, will now survive. About 15 mm was recorded in the Port Shepstone district on Tuesday night bringing the total rainfall so far this week to 30 mm. About 12 mm fell in the Kokstad district and about 7 mm in the Sezela area. Steady rains also fell in the Durban area and in several areas along the north coast. However, rain is still urgently needed in many areas of Zululand to increase the level of the water table. [Text] [Johannesburg THE CITIZEN in English 28 Oct 82 p 13]

DROUGHT KILLS CATTLE--Bulawayo.--Overgrazing by peasant farmers in Matabeleland has laid bare more than 172 000 ha of land bought for resettlement as well as all bordering communal areas and commercial farms. And 50 000 cattle have died this winter so far, Government sources disclosed in Bulawayo. Mr Enos Chikowore, of the Ministry of Local Government and Town Planning, Mr Moven Mahachi, the Minister of Lands, Resettlement and Rural Development and the Minister of Agriculture, Senator Denis Norman have visited parts of Matabeleland to assess damage by hungry communal cattle this winter. Some other facts to emerge from the Ministerial investigation were: Only three percent of communal cattle were sold this winter against 25 percent from the commercial sector. 50 000 communal cattle had died because of the drought, with another 10 000 or more expected to die during the next three weeks.--Sapa. [Text] [Johannesburg THE CITIZEN in English 23 Oct 82 p 10]

CSO: 5000/28

UNNECESSARY LOSS OF CATTLE CLAIMED

Mbabane THE TIMES OF SWAZILAND in English 13 Oct 82 pp 1, 16

[Article by Mashumi Twala]

[Text] THE DEATH of thousands of head of cattle "could have been avoided."

Their owners could have sold them to the Swaziland Meat Corporation before the cattle died of thirst and hunger, Meat Corporation manager, Mr. John Fourie, said yesterday.

The Ministry of Agriculture announced last week that the serious drought had already killed 23,096 cattle and another 11,000 to 12,000 could die before December.

But Mr. Fourie said yesterday: "It should not have come to that.

"The Meat Corporation is committed to buy cattle from local farmers, whether they are of good quality or not. We buy about 800 a month from the farmers."

Mr. Fourie pointed out that the Meat Corporation has feedlots--even emergency feedlots,--where cattle of poor quality were taken for fattening before being slaughtered.

"We stock about 4,000 for fattening every three months. The cattle that died and continue to die could easily have been brought to us at regular intervals and they would have been saved, at least partly. We have made announcements over the radio encouraging farmers to bring their cattle to us before they die," he said.

Mr. Fourie told The Times that the Meat Corporation, which is the country's main supplier of meat, "Does not need to import cattle from outside sources."

Commenting on recent reports that the Kingdom's butcheries had resorted to importing cattle from South Africa as a result of the current drought, Mr. Fourie said: "For us, it is not necessary."

He pointed out that the Meat Corporation "has enough meat for the local market. The meat that we get from slaughtering our cattle from the feedlots is of very good quality and is more than enough to supply all our butcheries and

still have some for export," he said. But we import a minimum amount of cattle from South Africa. Our aim is to use the supply we get from there to distribute it locally and use what amount we have derived from our local sources to supplement the amount we export, as we cannot export the meat we get from South Africa

"Presently we import somewhere between 80 and 90 cattle a month from South Africa, for the local outlets, at cheap prices. The South African feedlots have excess cattle to sell."

Mr. Fourie said the Meat Corporation also exports thin poor quality cattle, although not many, to overseas markets. He said: "There is a demand for them by meat product manufacturers, like makers of sausages."

He emphasised that the importation of cattle had absolutely no effect on the local beef prices. "In fact, we recently reduced our prices of meat, so that we now charge prices that are considerably cheaper than those in South Africa," Mr. Fourie said.

But he added that Swaziland presently could not meet her annual export quota of 3,000 tons of beef to the European Economic Community. "We just don't have enough cattle to export. There is a chance that we can eventually meet this quota. We plan to expand our feedlots and our breeding station. But due to the current drought, our cattle are well below the average weight. Making the amount of meat overall, considerably less."

Meanwhile the manager of another leading meat supplier, Shamrock Butcheries, Mr. George Potgieter, said Shamrock were importing half of the cattle they slaughter each week.

"We kill about 120 a week. Out of those, a half are imported from South Africa, because we get them at cheaper prices. But we continue to buy whatever we can get from this side.

"Many of the cattle here are not of the quality needed by our customers, so we have to import. We continue to buy some from the Swaziland Irrigation Scheme, but they have also dwindled in number over the last month. I am further told that there are no more fat cattle at the government fattening ranches." he said.

CSO: 5000/29

RWSB OBJECTIVES, PROJECTS DETAILED

Mbabane THE TIMES OF SWAZILAND in English 12 Oct 82 p 4

[Article by Mandla Magagula]

[Text]

THE Rural Water Supply Board of the Ministry of Works, Power and Communications is going all out to try and fulfil its set objective of providing water supplies to 25 percent of the rural population before the end of this year.

But as some senior officials at the Rural Water Supply Board (RWSB) conceded, this is going to be no easy task because the demand for these services is much higher than the output the department can offer to these communities.

Since 1978, a spokesman said, about 70 new projects have been completed and it is estimated that a sizeable percentage of the rural population are served with piped water.

During the last financial year, some 32 new supplies to service 35,580 people are reported to have been completed.

But the ultimate aim is to have the entire rural population getting water supplies by the year 1990, in accordance with the United Nations Drinking Water Supply and Sanitation Decade of 1980/90.

In addition to the Rural Water Supply Board's construction programmes, the United Nations is helping the Swaziland Government

with a Demonstration Water Supply and Sanitation Project to show the rural communities how improved water supplies and sanitation (coupled with effective health education and community participation) can contribute to the improvement of family health, particularly that of children.

Among other things, this demonstration project is also intended to cover environmental control of bilharzia transmission. The aim is to provide safe water and sanitation facilities for an estimated population of 10,000 people in the Shiselweni District south of Nhlangano.

When this project is completed, it is intended to be taken over by the operations and maintenance section of the Rural Water Supply Board.

At present, the spokesman said, the major constraints suffered by the board include the shortage of highly skilled artisans and foremen the movement of experienced staff who seek better salaries and permanent posts and the uncertainty and reportedly slow progress in concluding bilateral agreements for capital funding.

In addition, he said problems affecting the smooth functioning of the Inter-

Agency Inter-Ministerial Rural Development Co-ordinating Committee (IIRDCC), the unco-ordinated performance of District Teams and the slow pace of rural resettlement have combined to make planning and design somewhat difficult. It is also reported that implementation ultimately suffers and valuable manpower resources are consumed in the attempt to organise unilaterally.

The immediate tasks before the Rural Water Supply Board are now to alleviate these constraints and to ensure smooth continuity and implementation.

The board is said to be planning to achieve these two major objectives by continuing to train personnel academically and in the field, establish and fill posts with good remuneration to attract and keep skilled personnel, increase local capital gradually and recurrent funds concurrent with the availability and growth of skilled personnel; ensure that the necessary bilateral agreements for major capital funding are secured punctually and ensure the IIRDCC and District Teams are revitalised by lobbying at the level of principal Secretary.

The Rural Water Supply Board is expected to ensure continuity and good communication among the various ministries by setting sound policy.

This it is believed could be achieved by holding regular, quarterly meetings at which the board would be informed of the status of projects and the areas where policy decisions are required.

The Rural Water Supply

Board normally designs, constructs and maintains rural water supply systems identified and recommended by District Teams of which the District Commissioner is normally the chairman.

The board also provides technical assistance to other Government agencies in designing, constructing and maintaining such systems.

So far rural community have displayed their ignorance on what they should do should they feel they need a rural water supply system in their areas. Senior officials in the department have said there are a number of ways to do this.

The Chief of the area may send a delegation to the Rural Water Supply Board headquarters in Mbabane outlining the community's desire for a water supply system.

In some cases the Chief may write a letter of application to the RWSB Engineers. The Chief or his community's representative may send a delegation to the Clerk of Works to the nearest out-station who will then forward the request to headquarters for consideration.

The Chief or the community representatives may send a delegation or a letter to the District Commissioner who will then forward the application to headquarters in Mbabane.

When the RWSB headquarters has received the request, it can then arrange for a design team to visit the area and identify water source alternatives and make the relevant data collection.

When the relevant data has been collected the design team prepares a draft design and a cost estimate.

If the draft design and cost estimate indicate that the project is feasible, a detailed design is submitted to the British High Commission for possible approval.

The British Overseas Development Ad-

ministrative is one of the international agencies who provide capital for these water projects.

Usually, the community is expected to provide the labour during construction stage and then also bear the maintenance costs once the scheme has been completed.

These are some of the things the RWSB would like rural communities to understand so that when they have water problems they can communicate through the right channels.

The RWSB could be at present constructing water systems for say 10,000 people; but there are believed to be hundreds of thousands who need such services.

Government leaders have pointed out that so long as the rural resettlement programme had not been completed, it would be difficult to provide some of these basic services to scattered rural communities.

When rural communities are grouped into villages, the cost of bringing in electricity, water and other facilities would be reduced tremendously, it has been argued.

BRIEFS

FOREST FIRE--A FIRE swept through the government experimental forest at Mdzimba almost completely destroying all the trees. Only a few trees survived the inferno, according to the forestry department of the Ministry of Agriculture. A forestry official said some species were completely wiped out. The fires started at 4 p.m. last Thursday. Apparently some workers in the potato and maize seed experimental project in the area had been seen resting under a tree near where the fire started. Apparently leaves under the tree were set alight by a burning cigarette. The fire soon spread to the fenced forest nearby. The inferno eventually engulfed the entire forest which covers an area of about 10 hectares. Some of the species in the forest were eucalyptus, pines cypresses and cedars. The forest project is now eight years old and some of the trees were ready to be used as transmission poles for the Department of Telecommunications. Initially the eucalyptus were intended to be used as fuel wood for a tea industry. But the project was abandoned. "We then changed the policy and decided to use them for trials," an official said. "said some of the data collected in the experiment is used by Oxford University's forestry department for analysis and comparative studies. "For some time they will have to look for the data somewhere else," he said. [Text] [Mbabane THE TIMES OF SWAZILAND in English 13 Oct 82 p 16]

CSO: 5000/29

RESEARCH GROUP TO STUDY EFFECTS OF AIR POLLUTION

Copenhagen BERLINGSKE TIDENDE in Danish 14 Aug 82 p 3

[Article by Jens J. Kjaergaard: "Risø to Study Health Risk"]

[Text] When we burn oil, coal and gas in our home furnaces, industrial plants and automobiles, more than 1000 different substances are released into the air. Many of them can be cancer-causing and harmful to genes. As yet too little is known regarding the risk. But the problems are being studied at Risø.

Coal, sunlight, Freon and ground water are key words in the environmental chemistry work which is to show what happens to our surroundings while indispensable energy is being produced. The group of substances which has been especially focused on is called polycyclic organic materials, or simply POM. The Energy Ministry is supporting a project which is to clarify how much POM is formed in burning coal.

During the 60's we got a new pollution problem in Europe--"pollution blankets"--with air which burns one's nose. The sun's rays initiate chemical processes in the hovering dust which is brought in over the country from chimneys in the Ruhr and other industrial centers. Today it is possible to encounter haze and ozone masses in the middle of the summer even though it is a long way to large cities.

Risø's technical personnel are making measurements of this pollution with a substance which is called peroxyacetyl nitrate, or PAN. They do this very carefully because it is explosive in the pure state. But this problem seems to have been solved by a new technique.

A large part of the environmental debate concerns the destruction of the protective ozone layer which lies 20 km above the earth and checks the sun's health-threatening ultraviolet rays. Is there a greater risk of skin cancer now? Risø is studying this, for one thing, by means of computer calculations of the chemical reactions which are started when Freon rises into the air from spray cans, refrigerators and heat pumps.

Irradiation of a chemical sample for a few billionths of a second can reveal how quickly compounds form and decay. The method is called plus radiolysis, which is still used in only a few places in the world, and therefore Risø can contribute substantially to our knowledge of the health risk.

8831

CSO: 5000/2512

DENMARK

MINISTER TO STUDY 'PRESSURE' ON FIRMS FROM ENVIRONMENT GROUPS

Copenhagen BERLINGSKE TIDENDE in Danish 26 Oct 82 p 1

[Article by Michael Ehrenreich: "Pressure from Environmental Groups Studied"]

[Text] Environment Minister C. Christensen today will ask the Environment Administration to study the reasons why many firms apparently let themselves be pressured by local environmental groups to make costly environmental investments over and above the letter of the law.

This takes place in the face of statements yesterday from the leader of the Industry Council's environment division, Elo Hartig, who directed a strong attack against local environmental groups for going too far and pestering firms with demands for investments which they cannot at all afford.

The Paul Bergsøe og Søn [& Son] firm last week had to stop payments and give as one reason enormous expenses for environmental measures over and above the requirements of the environment legislation after pressure from a local environmental group.

"We must have a study made of how a pressure group can achieve economic influence over a firm to such an extent that the firm comes into economic difficulties," says C. Christensen who notes that both Elo Hartig and the Paul Bergsøe og Søn firm have expressed satisfaction with the environmental legislation.

"I am specially interested in having a more detailed study of the role of local authorities. If the firm does not yield to the pressure the first time around the local environmental group will perhaps direct the pressure against the municipal authority. We must investigate whether municipal authorities can feel obliged to make new demands on the firm in question," says C. Christensen.

8831

CSO: 5000/2512

DENMARK

BRIEFS

STUDY OF POWER PLANT EMISSIONS--The effect of coal-fired power plants on the water environment will bring together from Monday to Wednesday 150 researchers and technical personnel from 18 countries for an international conference in Bella Center in Copenhagen. The conference will be opened by Energy Minister Poul Nielson and Environment Minister Erik Holst and the three main topics will illustrate how the discharge of cooling water from power plants affects the ocean environment, problems regarding the accommodation of cinders and flying ash from coal burning and finally pollution from chimney smoke gases. The organizer of the conference is the Water Quality Institute in Hørsholm and the Environment Administration, ELSAM and ELKRAFT took part in the planning. [Text] [Copenhagen BERLINGSKE TIDENDE in Danish 14 Aug 82 p 3] 8831

CSO: 5000/2512

BAN ON AERIAL SPRAYING OF FORESTS EXTENDED FOR SECOND YEAR

Helsinki SUOMENKUVALEHTI in Finnish 23 Jul 82 pp 54-57

[Article by Juhani Virkki: "A Second Year Without Poison Flights"]

[Text] Just a month before this year's aerial spraying of undergrowth was to begin, the forest industry surprisingly decided to forego the flights "in order to prepare a law."

Supporters talk about an inhibiting substance, opponents about poisoning the environment. This is a war of information about methods of forest control, in which chemicals are used to destroy shoots of leafy trees in order to leave space and nutrients for saplings of evergreens.

Last summer there was no war, but the thing that causes it, aerial spraying of saplings, was abandoned while the snow was still on the ground. This year positions had already been staked out; without the retreat of the forest industry, about 6,000 hectares of undergrowth would have been sprayed from the air.

In Hattuvaara two years ago, August was a time of suspicious feelings. Environmental protectionists thought the people had had all they could take and the forest industry's comment about "an attitude based on feelings" contains a fear that this is true.

The decision taken in the spring of 1981 was based on a recommendation of the ministry of Agriculture and Forestry, which attempted to guarantee that the committee assigned to evaluate the importance to forestry of chemical eradication of undergrowth could work in peace. The committee's preliminary report was prepared last March, but it was circulated for expert opinion, so it was not delivered to Minister Taisto Tahkamaa until fall. The opinion is supposed to lead to a new law on aerial spreading of inhibiting substances.

"A Foot On the Brake"

When the ministry repeated its recommendation last spring, the Central League of the Forest Industry observed that it could no longer consent to restraint. But it said, however, that there was a foot on the brake; aerial spraying targets were selected "from among the most difficult." The Forestry

Department decided instead to continue to follow the ministry's recommendation on state lands, but in addition to the forest industry some owners of private forests requested permission for aerial spraying.

The decision of the forest industry, joined in by owners of private forests, came rather unexpectedly. It was made reluctantly, at Tahkamaa's initiative, after a couple of weeks of intensive negotiation. By pacifying the situation only a month before the aerial spraying was to begin, they hoped to speed up preparation of a new law so that parliament could consider it already this fall.

The goal is not an easy one. The committee that is studying the law has representation only from the Ministry of Agriculture and Forestry, the Central League of the Forest Industry, the Department of Forestry, and the private forest owners. This is because it was desired that the work of the committee be limited to discussion only of chemical inhibition of undergrowth in forests. At the level of regular preparation of a law, however, the matter will become a question of environmental protection and politics.

In Sweden, a moratorium on aerial spraying of undergrowth has been in effect for more than a year, and aerial spraying will be an issue in the September parliamentary elections. If the Centrist government remains in power the moratorium will probably continue, the Social Democrats would give the decision to the municipalities, and only a government of the Conservative coalition and the People's Party would begin to push for relaxation of restrictions.

There is less and less time for peaceful passage of laws in Finland as next November's parliamentary elections approach.

The area for aerial spraying this summer, about 500 hectares of industrial and 1,000 hectares of private undergrowth, would only have been about 2 percent of the whole area where growth needs to be controlled. The maximum amount of spraying, 32,000 hectares or 6 percent, was reached in 1977. The following summer the area went down to 16,000 and in 1980 to a little less than 10,000 hectares.

The committee preparing the new law has estimated that there will be a need for aerial spraying of a total area of 62,000 hectares during the next 10 years. The share of this in private forests, which will rise somewhat during the next 10 years, is just under 45 percent. Correspondingly, the share of the forest industry and the Department of Forestry will decrease slightly. All in all--and because practical steps taken will surely be less than needed--the areas sprayed each year will probably decrease in the future, assuming that a law to permit them is approved.

For: 23, Against: 17

The areas for aerial spraying would have been limited to five counties again this year: Mikkeli, Keski-Suomi, Kuopio, Pohjois-Karjala and Oulu counties.

According to the Central League of the Forest Industry, aerial spraying was planned for areas in 50 municipalities. In 27 municipalities it was decided that spraying should be prohibited, and a petition to that effect was sent to the Ministry of Agriculture and Forestry, which has the supreme authority in these cases. The possibility of municipalities petitioning for a prohibition is based on the 1978 law. The ministry uses as experts the district forestry boards, from whom it requests opinions regarding each aerial spraying area. Only a few petitions for prohibition are approved each year.

According to the law, aerial spreading of undergrowth-inhibiting substances can be prohibited if the undergrowth could be destroyed at reasonable cost by other means and if prohibition or restriction would be of significant advantage to environmental protection or the local population. Some examples of justification for prohibition are: danger of the inhibiting substance getting onto other plants because of scanty or scattered undergrowth, areas which are near means of transportation and where berries or mushrooms are collected, and areas inhabited by endangered species of animals and plants.

Where then is the problem, since the law requires the municipalities to explain in their petitions for prohibition the benefits that will accrue to the population and to environmental protection and the ministry almost always rejects the petitions? The problem is in the sensitive nature of the matter. The leaders of the municipalities know the content of the law, but they make a negative decision according to their own opinion or in fear of criticism from their electorate, knowing that it will be rejected by the ministry.

The most common bases of petitions for prohibition are that other methods of inhibiting undergrowth would employ more people and that previous decisions to prohibit aerial spraying have been made in the municipalities. The law does not provide that approval be granted for these reasons.

Chemicals for 44,000 hectares

Aerial spraying is not the only method of destroying leafy-tree undergrowth, but it is the only one for which permission from the Ministry of Agriculture and Forestry is required. In Finland this summer undergrowth poisons are being spread by other methods as well, in an area of almost 44,000 hectares.

About 2,300 hectares of this area is sprayed by tractor and about 5,000 hectares by backpack. The rest is treated by so-called mechanical-chemical inhibition, in which the growth is cut down with a chain saw, and at the same time an extra device on the saw sprays a permanent inhibiting substance onto the cut surface.

In addition to chemical and mechanical-chemical methods, there are, of course, purely mechanical methods of undergrowth inhibition, which are carried out using saws without extra devices or with brush hooks. This summer undergrowth is being controlled by these methods in an area of about 274,000 hectares.

The options can be examined as a question of costs. Clearing of 1 hectare with brush hooks costs between 520 and 1360 markkas according to forest industry calculations; 440 markkas with chain saws, plus 50 markkas if inhibiting substance is used in addition; 340 markkas with backpack spraying; and 215 markkas with aerial or tractor spraying. Only aerial spraying costs the same everywhere--though helicopters are cheaper than airplanes--while the costs of other methods can vary greatly with the terrain and the skill of the workers. In addition, the use of brush hooks and chain saws without the additional device requires repeated treatment.

Undergrowth inhibition as a means of alleviating unemployment is not an attractive feature of the forest industry. It is not generally believed that a sufficient number of workers would even be available. Not everyone can even swing a brush hook, and chain-saw users are skilled foresters. Lack of experience requires training, training requires supervision and additional expenses. In the case of chemical inhibition these consequences are heightened by requirements for worker safety.

But it is not considered impossible that in certain situations undergrowth control could be used as work for the unemployed. But initiatives are not regarded as the responsibility of the forest companies, because even though the state would pay them an employment subsidy, it is calculated that the result would be more or less zero.

Expense, speed--and safety--therefore are points in favor of aerial spraying wherever it is found to be possible. Restrictions can prevent or retard undergrowth control, and according to the forest industry they will show up in time as surprisingly large debit figures in forest production. The extreme options in forest control are to do nothing and to do everything according to a care and purchase agreement with some forest adviser, forester or company. The former option would produce, in comparison with the latter, less of all kinds of useful wood, essentially less industrial wood and much less money to forest owners.

Five Brands in Use

The forest industry does not consider chemicals as poisons but only as inhibiting substances--or growth-protecting substances--that require a certain care for the good of the environment and the user. Nor does the industry see a need to defend itself with the fact that the [aerial] spraying areas are only a fraction of the areas that are being sprayed on the surface, partly with the same chemicals. Instead the industry wishes to emphasize that the chemicals have been studied by others than themselves and have been approved for use by others.

What substances are being used then? There are five brands: MCPA; 2,4-D; glyphosate; a mixture of MCPA and 2,4-D; and a mixture of pichloramine and 2,4-D. By far the most used are glyphosate and the mixture of MCPA and 2,4-D, which is also known as DM. These two are considered significantly safer than MCPA, which was the most common in the 1970's. There is no unanimity as to the danger or safety of these substances, and there are studies that point in both directions.

Information is lacking particularly about the long-range effects of inhibiting substances in the natural cycle. Of course it is known that they work well on undergrowth, and at the same time they prevent the spreading of pine-shoot rust, the worst sapling disease that spreads through cuts.

Foreign studies are not always directly applicable to Finland's weather conditions. The most extensive study was made at Joensuu College at the end of the 1970's. There the effects of MCPA on the soil of a test site were followed for a period of 4 years. According to the results, inhibition of leafy trees was complete, but the yield of berries and mushrooms decreased significantly in comparison to surrounding areas, and the inhibiting substance disappeared from the soil in the forest much more slowly than from fields. It is difficult to draw conclusions, because the spreading of MCPA has decreased noticeably. It is used mostly in direct application to trees with chain saws or in so-called "pocketing," by which is meant that the stumps have already been treated before the saplings are planted.

According to the forest industry, chemicals are safe when used properly, and it is useless to keep worrying about a few mistakes of previous years. One of the worst substances is the feared 2,3,5-T, known as the Vietnam poison. It has not been used since 1980.

In any case, undergrowth-inhibiting substances have a so-called "danger time," during which berries and mushroom should not be gathered in treated areas. The danger time for glyphosate is a week, that of DM is from the time of spraying until the end of the year. According to the law, aerial spraying must be announced to the residents of the surrounding area at least a week beforehand, and the sprayed area must be marked with prominent signs.

But, as we know, Finns leave berries and mushroom to rot in other places as well, so any losses should not be irreplaceable. The following claim may seem surprising, but it is very probably true: in the areas of aerial spraying, that is, areas logged 2 or 3 years ago, few berries grow anyway and hardly any mushrooms. The same is true of all stands of saplings, treated or untreated. Of course some individual berry bushes can be found even in undergrowth areas, but generally it is useless to go there with bucket in hand.

Reason or Irrationality

In the interim report prepared last spring by the committee on inhibiting undergrowth it was reported unanimously that there should be as few as possible restrictions on chemical inhibition.

But one of the committee members, forester Matti Oksanen of the Central League of the Forest Industry, says that the [final] report will recommend a change in the law to transfer the decisionmaking power from the Ministry of Agriculture and Forestry to the municipalities. According to the change, the municipalities could approve or reject aerial spraying petitions, but the decisions would still have to be ratified by the ministry. Thus the workload that now burdens the ministry would be reduced to rubberstamping

decisions if the municipalities will, as envisioned by the law, evaluate the significance of each request from the point of view of environmental protection and the residents of the municipality and if they will use the district forest boards for assistance.

Speaking of the position of industry, but representing the whole committee, forester Oksanen says: "We have certainly been quite optimistic that reason will prevail."

But Press Secretary Ismo Tuormaa of the Finnish Environmental Protection League says on his part: "The goal of the committee has certainly been pure irrationality." According to him, the economic significance of aerial spraying is infinitesimally small, and industry is applying the domino theory to the matter: if they were to give in on this, they might have to give up other things as well.

"Industry and environmental protection are not on opposite sides in this, nor is it the Helsinki environmentalists and industry, but people throughout the country and obstinacy."

Tuormaa thinks that ways of using the forests should be changed, mechanical inhibition should be increased, and various kinds of forest control methods should be tried with a long-range viewpoint, because "time after time harmless substances have been found to be dangerous and have been prohibited."

"The municipalities should be given the possibility of saying yes or no clearly. There is no need for any statements by district forest boards, which go into speculative details that obscure the whole. It is a question of environmental and people's democracy. Gallup would find that 90 percent of the people are against aerial spraying."

"The Finnish Environmental Protection League published a statement last spring in which it was said that 'it would not be surprising' if aerial spreading of undergrowth poisons caused open conflicts in many places. We would not have wanted them or organized them, but if people have had all they can take ... If anything had happened, the responsibility would not have been on the environmental protectionists nor on the local residents, but on the political decisionmakers," says Tuormaa.

"And even if peace prevails, we should remember that the problem remains, it is not a civil movement."

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GREECE

POSSIBLE RADIOACTIVE URANIUM POLLUTION

Athens I KATHIMERINI in Greek 20 Oct 82 p 1

/Excerpt/ High-level radioactive uranium is being released into the atmosphere through the burning of lignite at the DEI /Public Power Corporation/ thermoelectric power plant at Megalopolis. This amount of radioactivity is equivalent to that resulting from the operation of a nuclear electric power plant.

The above revelation was made by Mr Kharalambous, professor of nuclear physics at the University of Salonica, at the Congress on the Peaceful Uses of Nuclear Energy being held at the National Research Institute.

As was emphasized, the event was due to the quantity of radioactive uranium contained in lignite that is burned at the plant.

Mr Kharalambous stressed that despite the offer by the nuclear physics laboratory of the University of Salonica to conduct test checks on the uranium content being released at the DEI plant at Megalopolis, the proper context permitting these checks has not as yet been created.

Developing his proposal before the congress, the professor also warned about the dangers resulting from lignite ash used at thermoelectric power plants for the manufacture of housing construction materials. He observed that ash contains a high-level amount of radioactivity.

The above facts, that were announced on the existence of sufficient quantities of lignite radioactivity produced in thermoelectric power plants, if combined with similar revelations of scientists, would present a serious environment pollution problem in those areas where plants that utilize vast amounts of lignite are operating.

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